Managing corn in narrow row spacing - does intensive management make sense?

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INTRODUCTION

- In the US, corn (*Zea mays*) is one of the most commonly grown crops.
- Most farmers want to maximize production and profits per acre.
- Intensive management practices to increase yield have limited evaluation in narrow row corn production (<30 inch row spacing).
- Research is needed to help producers to decide if they want to apply foliar nitrogen (N) and fungicides at or around corn tasseling.

OBJECTIVES

1. Determine if 15-inch and 30-inch corn row spacings have a difference in disease incidence.
2. Determine the effects of foliar N on corn in 15-inch and 30-inch corn row spacings.

METHODS

- Field study was conducted at two OARDC locations:
  - Western Research Station, South Charleston, OH
  - Northwest Research Station, Custar, OH
- Split-plot randomized complete block design with four replications.
  - 15-inch and 30-inch corn row spacing
  - Four Treatments
    - Untreated Control
    - Foliar Fungicide at stage R1 (silking)
      - Aproach Prima (6.8 fl oz per A)
    - Foliar N at stage R1
      - CoRoN 28-0-0 Ag (2 gal per A)
    - Foliar Fungicide and Nitrogen at stage R1
  - Pioneer Hybrid Seed
    - P0825AM
    - P0843AM
- Measurements taken at corn tasseling (VT) stage and about 14 days after foliar application (DAA).
  - Ear leaf N (untreated and treated)
  - Ear leaf disease rating (*Cercospora zeae-maydis*, gray leaf spot), Figs. 1 & 2
  - Grain yield and harvest moisture
    - Reported yields are adjusted to 15.5% moisture
- Statistics
  - Data was analyzed using Proc MIXED in SAS 9.4. When the Global *F*-Test was significant ($\alpha = 0.05$) means were separated using paired t-tests.

RESULTS AND DISCUSSION

Table 1. Foliar disease ratings of the ear leaf (before and 14 DAA), grain yield and harvest moisture for each hybrid and foliar treatment at the Western Branch Research Station.

Treatments		Ear Leaf, Before	Ear Leaf, 14 DAA	Yield	Harvest Moisture
		%	%	Bu/A	%
Hybrid	P0825AM	0.14	6.5a	283.3a	16.1a
	P0843AM	0.10	4.9b	272.8b	16.0b
	P-Value	0.123	<0.001	<0.001	0.020
Foliar Treatment	Untreated	0.10	6.3	277.8ab	15.9b
	Fungicide	0.13	5.3	276.8b	16.2a
	Foliar N	0.11	5.4	272.7b	16.0ab
	Fungicide + Foliar N	0.14	5.8	284.8a	16.2a
	P-Value	0.689	0.330	0.014	0.003

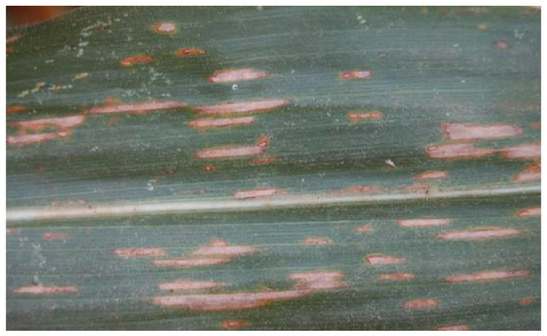

Figure 1. Gray leaf spot lesions in corn. *From* Salgado et al. (2016), Gray leaf spot of corn. Factsheet PLPATH-CER-05. The Ohio State University, Columbus, OH.

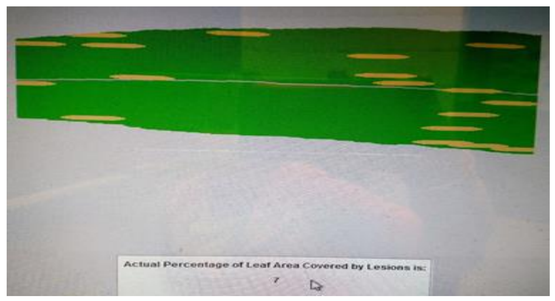

Figure 2. A screenshot from a gray leaf spot disease training computer program during the summer of 2016.

Table 2. Foliar disease ratings, grain yield and harvest moisture for each hybrid and foliar treatment at the Northwest Research Station. Hybrids were analyzed separately because P0843 was only planted in 30 inch rows.

Hybrid	Foliar Treatment	Ear Leaf, Before	Ear Leaf, 14 DAA	Yield	Harvest Moisture
		%	%	Bu/A	%
P0825AM	Untreated	1.8	4.0b	164.6	18.8
	Fungicide	1.6	4.3b	168.2	18.9
	Foliar N	1.7	4.9b	167.3	18.6
	Fungicide + Foliar N	1.6	7.4a	172.3	18.8
	P-Value	0.556	<0.001	0.174	0.622
P0843AM	Untreated	1.1	3.5c	164.9	19.8
	Fungicide	1.0	3.5c	167.5	19.6
	Foliar N	1.0	5.3b	164.1	19.7
	Fungicide + Foliar N	1.0	7.7a	163.2	19.4
	P-Value	0.691	<0.001	0.816	0.541

Table 1

- Greater gray leaf spot incidence for P0825AM did not result in lower yield compared to P0843AM.
- None of the foliar applications impacted the disease levels
- Yield among the treatments was similar to the untreated control.

Table 2

- Fungicide + Foliar N treatment had the highest gray leaf spot compared to the other treatments 14 DAA for both hybrids
- Yield results were similar across the different foliar treatments.

Row Spacing and Nitrogen

- 15-inch and 30-inch corn row spacing at the two locations had no influence on gray leaf spot, ear leaf N content and yield (data not shown).
- Ear leaf N content was comparable between the foliar treatments at each site (data not shown).

CONCLUSIONS

1. This research suggests intensive management may not be beneficial for corn production in narrow rows.
2. The authors recommend using integrated pest management (IPM) practices to address corn disease issues.
3. Corn in 15-inch row spacing exhibited similar disease or impact on corn N uptake to corn in 30-inch row spacing.
4. The research will be repeated to validate the observed results.

THE OHIO STATE UNIVERSITY

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